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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,256	06/22/2001	Glen E. Howard	004978 USA/ETEC/RWM	8744

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APPLIED MATERIALS, INC.  
2881 SCOTT BLVD. M/S 2061  
SANTA CLARA, CA 95050

EXAMINER

PHAM, HAI CHI

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 03/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/888,256

Applicant(s)

HOWARD ET AL.

Examiner

Hai C Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-30 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-14, 16-22 and 31-33 is/are rejected.
- 7) ☒ Claim(s) 6 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Objections*

1. The following claims are objected to because of the following informalities:

Claim 7:

- Lines 2-3, "1800 Kelvin" should read --1800 degrees Kelvin--.

Claim 16:

- Line 2, "1800 Kelvin" should read --1800 degrees Kelvin--.

Claim 28:

- Lines 2-3, "1800 Kelvin" should read --1800 degrees Kelvin--.

Claim 33:

- Line 2, "1800 Kelvin" should read --1800 degrees Kelvin--.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Smith et al. (U.S. 5,422,926).

Smith et al. discloses an electron beam generator used in an x-ray producing device, the electron beam generator (Fig. 4) comprising an anode (24), a cathode (22) comprising an electron emitting portion and having a cathode axis (electron beam axis 16), an electromagnetic radiation source (laser 56) adapted to generate an electromagnetic radiation beam to heat the cathode, and a lens (58) adapted to direct the electromagnetic radiation beam onto the cathode, the lens having a lens axis that forms an acute angle with, or is substantially parallel to, the cathode axis (the laser beam being focused by the lens 58 onto the cathode 22 in the direction parallel to the axis of the electron beam emitted from the cathode).

With regard to claim 2, Smith et al. discloses the lens directing the electromagnetic radiation beam onto the beam-receiving portion [formed on the back] of the cathode (22).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-5, 7, 10-14, 16, 19-21, 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. in view of Liu et al. (U.S. 4,588,928).

Smith et al. discloses all the basic limitations of the claimed invention except for structural configuration of the cathode, the vacuum chamber, the cathode being heated

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at about 1800 degrees Kelvin (claim 7), the electron beam modulator and scanner (claim 10), the cathode being negatively biased relative to the anode (claim 19).

Liu et al. discloses a field-emitter type electron beam exposure system in which the electron beam source comprises a cathode having an electron emitting portion made of tungsten (crystalline rod of tungsten 10) and having a tip (Fig. 1), a concave beam receiving portion (12) different from the electron emitting portion, the cathode being heated about 1800 Kelvin (from 1700 to 1850 degrees Kelvin) while being negatively biased relative to the anode (34) (col. 4, lines 37-56). Liu et al. further teaches the electron beam exposure system being used for forming writing spots on the surface of a workpiece (54) supported on a substrate (workpiece stage 56), the system including a vacuum chamber (not shown) (col. 4, lines 23-29), and an electron beam modulator and scanner consisting of the demagnification lenses (50, 52), electrostatic deflectors (60, 66).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Smith et al. with the aforementioned teaching of Liu et al. for the purpose of producing a high-speed, stable and highly reliable electron beam source.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. in view of Osborne et al. (WO 96/02932).

Smith et al. discloses all the basic limitations of the claimed invention except for the lens comprising aluminum oxide.

Osborne et al. discloses an electron beam generator having a focusing lens made of aluminum oxide, which is known having a thermal conductivity suitable for removing heat.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the lens of Smith et al. to incorporate the aluminum oxide layer as taught by Osborne et al. for the purpose of insulating the lens from the heat generated by the cathode in emitting the electron beam.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. in view of Liu et al., as applied to claim 10 above, and further in view of Osborne et al.

Smith et al., as modified by Liu et al., discloses all the basic limitations of the claimed invention except for the lens comprising aluminum oxide.

Osborne et al. discloses an electron beam generator having a focusing lens made of aluminum oxide, which is known having a thermal conductivity suitable for removing heat.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the lens of Smith et al., as modified by Liu et al., to incorporate the aluminum oxide layer as taught by Osborne et al. for the purpose of insulating the lens from the heat generated by the cathode in emitting the electron beam.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. in view of Johnson et al. (U.S. 3,583,810).

Smith et al. discloses all the basic limitations of the claimed invention except for the electromagnetic radiation detector to detect radiation reflected from the cathode to determine a property of the cathode.

Johnson et al. discloses an electron beam generator including a radiation sensor (68) for receiving the reflected radiation from the hollow cathode (24) to observe/monitor the property of the cathode (col. 4, lines 59-75).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a radiation sensor as taught by Johnson et al. in the device of Smith et al. for the purpose of monitoring the property of the cathode and the energy of the radiation.

9. Claims 18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. in view of Liu et al., as applied to claims 10 and 19 above, and further in view of Johnson et al.

Smith et al., as modified by Liu et al., discloses all the basic limitations of the claimed invention except for the electromagnetic radiation detector to detect radiation reflected from the cathode to determine a property of the cathode.

Johnson et al. discloses an electron beam generator including a radiation sensor (68) for receiving the reflected radiation from the hollow cathode (24) to observe/monitor the property of the cathode (col. 4, lines 59-75).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate a radiation sensor as taught by Johnson et al. in the device of Smith et al., as modified by Liu et al., for the purpose of monitoring the property of the cathode and the energy of the radiation.

***Allowable Subject Matter***

10. Claims 23-30 are allowed.

11. Claims 6, 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is an examiner's statement of reasons for allowance: the primary reason for the indication of the allowability of the claimed invention is the inclusion of the limitation, in the combination as currently claimed, that the lens used for directing the electromagnetic radiation beam onto the cathode, is attached to the rod whose terminal is the electron emitting portion of the cathode of the electron beam generator. It is this limitation, as recited in combination in each of the claims 6, 15, 23-30, that is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination, that makes the claims allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."



***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin R. Fuller can be reached on (703) 308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



HAI PHAM  
PRIMARY EXAMINER

March 14, 2003